## CLAIMS

1. A particle separator for separation of first and second mixed fluids, as hereinbefore defined, comprising a non-metallic housing containing an annular through-flow chamber, an inlet to the housing for introduction of a mixture of the first and second fluids into said through-flow chamber, a portion of said through-flow chamber being encircled by a magnetic coil, an anode located in said chamber portion, coil cooling means for cooling the magnetic coil by means of a first coolant, a cooling conduit extending through said chamber portion and adapted to cool said anode by means of a second coolant, a high voltage pulsating DC power source connected to said magnetic coil, a further DC power source connected to said anode, fluid separation means positioned downstream of said through-flow chamber portion to receive energised fluid mixture that has been subjected to the magnetic field created by pulsing of the magnetic coil, the fluid separation means being so arranged as to separate the first and second fluids from the energised mixture.

2. The separator of claim 1, in which a pulsating DC power source is connected to said anode;

3. The separator of claim 1 or claim 2, wherein said anode is tubular.

4. The separator of any of the preceding claims, wherein the non-metallic housing comprises one of glass, polyethylene, polypropylene, polybutylene, polyketone, polycarbonate, polyvinyl chloride, polyvinyl acetate, ceramic, wood, fibreglass, cross linked polymers, non-cross linked polymers, other non-magnetic materials, or mixtures thereof.

5. The separator of any of the preceding claims, wherein the non-metallic housing has a coated interior.

6. The separator of claim 5, wherein the coated interior is coated with a corrosion resistant material.

7. The separator of claim 6, wherein the coated interior is a friction reducing coating.

8. The separator of any one of the preceding claims, wherein the anode is disposed within and near the axis of the cooling conduit.

9. The separator of any one of the preceding claims, wherein two anodes are disposed in the chamber.

10. The separator of claim 2, or any one of claims 3 to 9 each as appended to claim 2, wherein the pulsating DC power source to said anode is arranged to be synchronized with the pulsating DC power supply to said magnetic coil.

11. The separator of any one of the preceding claims, wherein the pulsating DC power source to said magnetic coil pulses at an atomic resonance frequency so chosen as to match the frequency of discrete ions or elements of said first or second fluid.

12. The separator of any of the preceding claims, wherein the first and second coolants are selected from the group: distilled water, glycerine, a dielectric transformer coolant, and mixtures thereof.

13. The separator of any one of the preceding claims, wherein the magnetic coil is wrapped around the housing.

14. The separator of claim 13, wherein the magnetic coil is torridly wrapped around the housing.

15. The separator of claim 14, wherein the magnetic coil is wrapped around the housing in a plurality of individual torridly compressed loops.

16. The separator of claim 15 in which said loops each comprise arcuate sections each of tuned length.

17. The separator of any one of the preceding claims, wherein the magnetic coil is disposed in the cooling conduit spaced apart from said anode.

18. The separator of any one of claims 1 to 12, wherein two magnetic coils are wrapped around the housing.

19. The separator of any one of claims 1 to 12, wherein the magnetic coil is disposed in the housing.

20. The separator of any one of the preceding claims wherein the anode is a member of the group: solid metal wire and a suitable core.

21. The separator of claim 20, wherein the metal is electrically conductive.

22. The separator of any one of the preceding claims, further comprising an electro-magnetic shielding system disposed around the separator.

23. A separator as claimed in any one of the preceding claims in which said fluid separation means is a laminar fluid separation means.

24. A separator as claimed in claim 23 in which the laminar fluid separation means comprises a funnel defining a first outlet within the funnel and a second annular outlet external to the funnel, the relative

cross-sectional areas of the entrance to the funnel, and the annular space around the funnel entrance being so chosen according to the amount of the targeted element in the mixture to be subjected to separation.

25. A separator as claimed in any one of claims 1 to 22 in which the fluid separation means is a cyclonic separator.

26. A separator as claimed in claim 25 in which the fluid separation means comprises two cyclonic separators.

27. A laminar particle separator for liquid-liquid separation comprising a lower section comprising a non-metallic housing having an annulus and a chamber, at least one magnetic coil disposed adjacent the chamber and cooled with a first coolant, a high voltage pulsating DC power source connected to said magnetic coil; and a fluid inlet port connected to the housing, an upper section comprising a non-metallic separator tube connected to the housing and disposed within the housing, a first fluid outlet connected to the non-metallic separator tube, and a second fluid outlet connected to the annulus through the housing.

28. A cyclonic particle separator for liquid-liquid separation comprising a non-metallic housing with a chamber, at least one magnetic coil disposed adjacent the chamber and cooled with a first coolant, a high voltage pulsating DC power source connected to said magnetic coil, at least one cyclonic separator disposed in the chamber and wherein said cyclonic separator has a fluid inlet, and brine outlet, and a cyclonic separator freshwater outlet; and a freshwater outlet fluidly connected with the cyclonic separator freshwater outlet.

29. A laminar method for particle desalination comprising using a tube and a magnetic coil disposed in a chamber, flowing seawater into the chamber and out of a brine outlet and a freshwater outlet and simultaneously energising the magnetic coil, creating freshwater in the chamber, flowing the freshwater near the tube and attracting the freshwater into a separator tube; and flowing the freshwater from the separator tube into the freshwater outlet.

30. A method of separating a selected component from a mixture of fluids, as hereinbefore defined, comprising introducing the mixture to a chamber and subjecting the mixture in a portion of the chamber to a magnetic field created by subjecting a liquid-cooled coil encircling said chamber portion to DC voltage pulses of characteristics chosen to energise the selected component of the mixture, and whist the selected component remains at least partially energised, using a separation means which is adapted to divert the energised components to a different outlet from that to which relatively unenergised components of the mixture pass.

31. The method of claim 30, wherein said energising comprises using at least one pulsating frequency which matches the atomic frequency of at least one component being separated.

32. The method of claim 31, where a plurality of atomic frequencies of materials are matched through a digital indexing through specific frequencies using a magnetic field.

33. The method of claim 32, wherein the matching step is performed using a magnetic field using discrete atomic (NMR) frequencies.

34. A method as claimed in any one of claims 30 to 33 in which said separation means employs a laminar method for separating two flows of materials, a separator tube being arranged to separate the two laminar flows to direct said flows to different outlets.

35. The method of claim 34, wherein separated material flows through the separator tube using the Coanda effect.

36. A method as claimed in any one of claims 30 to 33 in which said separation means employs a cyclonic method for creating two separate flows of materials.

37. The method of any one of claims 30 to 36, wherein an anode is located in said portion of the chamber and said anode is simultaneously energised with said magnetic coil.

38. A cyclonic method for particle desalination comprising using a tube and a magnetic coil disposed in a chamber, flowing seawater into the chamber and out of a brine outlet and a freshwater outlet and simultaneously energising the magnetic coil, creating freshwater in the chamber, using cyclonic forces to maintain a separation between the freshwater in the chamber and the seawater flowing into the chamber; and flowing the freshwater near the tube and attracting freshwater from the cyclonic separator outlet into the freshwater outlet.

39. The method of any one of claims 30 to 37 in which the mixture is in the form of fluidised finely ground dry materials.

40. The method of any one of claims 30 to 38 in which the mixture is a mixture of liquids.

41. The method of claim 39 in which the mixture is salt water.